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ABSTRACT

This paper discusses a study that examines the responses of introverted and extraverted college students (N=72) to the use of e-mail. Results show that extraverts use e-mail as a form of procrastination more than introverts and that extraverts find e-mail more disruptive to their work than introverts. No significant differences were found in terms of time spent on e-mail, but the range of time spent daily was much greater for extraverts. Neither were there significant differences for the number of times per day that participants checked their e-mail, nor on indicators of subjects' responsiveness to e-mail. However, ranges of responses varied. All participants perceived e-mail as generally valuable. Over two-thirds of respondents leave their computer on throughout the day. Nearly 90% communicate via e-mail at least daily and reported checking e-mail messages more than once a day on weekends as well. However, only 15% spend greater than an hour per day on e-mail. Over 90% report that e-mail at least occasionally disrupts their work and acknowledge their occasional use of e-mail to procrastinate. Over 95% report that junk e-mail bothers them; only 15% belong to discussion groups. An alarming 20% actually read less than half of the message they receive and only 7% reply to all of their e-mail. In contrast, two-thirds expect others to respond to message they send within a day. Nearly half believe that e-mail is secure and private, yet 50% report trying to avoid revealing personal information over e-mail. Roughly 10% see computer technology as always reliable and only 5% report experiencing technical difficulty when accessing e-mail. Only one-fourth feel frustrated and/or negative about needing to learn to use new software application. Overall, this study suggests that e-mail technology may be creating a greater burden for extraverts than for introverts. Topics for future research in this area are discussed. (MKA)

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College Students' Use of Electronic Communication Technologies: Introverts versus Extraverts

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Introduction

Rapidly expanding information technologies are transforming the lives of workers and students. Increasing use of personal computers to access e-mail and Internet sites, coupled with rising cell phone penetration and voice-mail use, have been associated with improved productivity. Systems such as an internal network are useful in the workplace because they allow workers to exchange ideas throughout the day. These also facilitate communication across the different ranks within a company. These innovations have fostered more rapid communication within organizations, and have permitted more widespread collaboration among different departments.

Simultaneously, these tools have created certain problems for some technology users, related to the accelerated pace of work and increased expectations of both workers and students. Research has shown that information technology has measurably contributed to rising levels of stress and concerns about excessive computer use in many workers and students. Goldsmith (2000) studied computer usage among Scandinavians and found they are becoming increasingly stressed due to their desire to surpass all others in the race for leadership in the global technology arena. This obsession with computer technology has led to a decrease in personal care and reductions in overall well-being (Goldsmith, 2000). Goldsmith cited a study conducted by Dr. Donald Black of the University of Iowa College of Medicine, stating that "there is a growing number of students...out there who have a problem with excessive and problematic computer use." The consequences of computer abuse can include social isolation, marital conflict, and financial problems (McKinney, 2000). Students are often use the Internet to distract

themselves from their problems. However, avoiding facing their real life stressors generally serves to only augment them (Murray, 2000).

In order to enhance our understanding of both the costs and benefits associated with more widespread application of information technology, it is important to consider how personality characteristics may mediate the impact of these changes, yielding different effects between groups. The dimension of extraversion (Eysenck, 1975), has been consistently found to be associated with how individuals respond to a variety of situations. In contrast to those classified as introverts, extraverts tend to be outgoing, unguarded, forthright, and have an accommodating nature that adapts easily to a given situation; they quickly form attachments, and readily aside any possible misgivings; they often venture forth with careless confidence into unknown situations (Ryckman, 1997).

Given the extraverted group's preferences for social stimulation, they might be expected to have difficulty spending considerable time and energy in front of a computer monitor, thereby depriving themselves of direct human contact. Alternatively, since e-mail technology facilitates social interaction among physically distant users, permitting rapid and even simultaneous exchanges with a potentially vast number of contacts, extraverts may find this technology extraordinarily reinforcing. For some extraverted students this may prove troublesome; the appeal of e-mail interactions may prove irresistible, causing it to interfere with performance and fulfillment of various responsibilities.

The responses of introverts to information technology are also somewhat difficult to predict. On the one hand, this technology offers members of this group certain distinct advantages. It reduces the need for direct interpersonal interaction, providing introverts

the chance to participate in conversations without their having to tolerate the discomfort they typically experience in social situations. They are freed to share their ideas at a safe distance. In addition, they can regulate the flow of social stimulation they experience by limiting their exposure to communication from others, in a way which is impossible in face-to-face encounters. This ability to contribute to social exchanges remotely and to pace exposure optimally might enable introverts to function much more productively as a result of the new information technologies.

While this is theoretically true, in practice, the onslaught of e-mail demands may be disadvantageous for many introverts if they experience a steady stream of e-mail and voice mail messages as incessant demands to interact with others. This relentless social pressure may overwhelm the introverted individual, leaving them feeling excessively stimulated and uncomfortable. The new technology (e-mail, voice mail, and cell phone systems) may all intrude upon the introvert's highly valued privacy, making it more difficult for them to cope.

In order to assess these hypotheses, extraverts' and introverts' responses to e-mail technology were assessed in a variety of ways. Extraverted students were expected to make greater use of e-mail and to report finding it more distracting than introverted students.

Methods

Participants

Participants were 29 male and 43 female college students from a small, liberal arts college located in the suburbs of Philadelphia. The participants were all students in an

Introduction to Psychology class, and all levels (freshmen through senior) represented. The mean age of the participants was 18.87 years.

Survey Instruments

A survey consisting of four pages was distributed to students; it pertained to their views and uses of new communication technology, particularly e-mail. Questions in the survey were also used to determine extroversion and introversion. Students' views of technology were assessed using 11 Likert-format items (1=Never, 2=Rarely, 3=Sometimes, 4=Always). Participants also responded to 23 questions to assess personality type (extrovert and introvert). These extroversion and introversion scale items were taken from the Eysenck Personality Questionnaire, also known as the EPQ.

Procedure

Students in an Introductory Psychology class were asked to respond to the survey. Each student was asked to place their Social Security number on the survey to receive the extra credit they were offered. The survey was scored and analyzed anonymously. Two researchers handed out the survey and collected them within a 15-minute period at the beginning of class.

Results

Extraversion scores were calculated for each participant by totaling the directionally adjusted items on the Eysenck extraversion measure. A median split was used to create extraverted and introverted groups.

Between group t-tests were performed on all measures. Extraverts reported using e-mail as a form of procrastination more than introverts (extraverts: x= 3.13, s.d.= .66, n= 32 versus introverts: x= 2.46, s.d.= .78, n= 35; t=3.77, df=65, p=.000). The data also showed that extraverts report finding e-mail more disruptive to their work than introverts (extraverts: x=2.66, s.d.=.65, n= 32 versus introverts: x= 2.29, s.d.= .79, n= 35; t-2.09, df=65, p=.041).

No significant difference between extraverts and introverts was found in terms of time spent on e-mail (extraverts: x= 35.81, s.d.= 39.06, n=32 versus introverts: x= 25.2, s.d.= 14.72, n=35; t=1.5, df=65, p= .139). However the range of time spent daily on e-mail was much greater for extraverts than for introverts (1-180 minutes for extraverts versus 10-60 minutes for introverts).

There were also no significant differences between extraverts and introverts on the number of times per day that e-mail was checked , nor on indicators of subjects' responsivity to e-mail. However, ranges of responses varied; introverts reported checking their e-mail on weekdays and weekends between 0 and 100 times, as compared to extraverts who checked only between 0 and 30 times.

All participants perceived e-mail as generally valuable. Over two-thirds of respondents leave their computer on throughout the day. Nearly 90% communicate via e-mail at least daily and reported checking e-mail messages more than once per day on weekdays. Nearly two-thirds check their e-mail more than once per day on weekends as well. However, only 15% spend greater than an hour per day on e-mail. Over 90% report that e-mail at least occasionally disrupts their work, and acknowledge their occasional use of e-mail to procrastinate.

Over 95% of the participants report that "junk" e-mail bothers them, and only 15% currently belong to discussion groups. An alarming 20% report actually reading less than one-half of all the e-mail messages they receive and only 7% reply to all of their e-mail. In contrast, two-thirds expect others to read e-mail the subject sends to them within one day.

Nearly half believe that e-mail is secure and private, yet 50% report trying to avoid revealing personal information over e-mail. Roughly 10 % see computer technology as always reliable, and only 5% report experiencing technical difficulty when accessing e-mail. Only one-fourth feel frustrated and/or negative about needing to learn how to use new software applications.

Discussion

The current findings suggest that e-mail technology may be creating a greater burden for extraverts than introverts. Extraverts are frequently using e-mail as a form of procrastination, and it therefore is disrupting their work. Extraversion was once thought to be a positive attribute that generally enhanced functioning in both school and in the work force. The current findings suggest that introversion may be becoming more of an asset and extraversion may be associated with compromised performance.

Extraverts are spending up to180 minutes on e-mail per day, while their introverted counterparts are only spending a maximum of 60 minutes per day. Although this distinction shows that extroverts are communicating for a longer amount of time, often it interferes with their work.

The fact that introverts check their e-mail up to 100 times per day on both weekdays and weekends, while extroverts only check up to 30 times per day on

weekdays and weekends, is consistent with the description of these personality traits. Extroverts may spend most of their day communicating face-to-face, while introverts are spending more time alone, and presumably therefore have more time to check e-mail.

E-mail is generally perceived to be a valuable tool in communicating and keeping in touch with family and friends. It is also valuable in educational institutions and in the work force. E-mail is becoming the most preferred tool of communication, taking the place of face-to-face encounters, the telephone, and mail contact. Nearly all participants communicate through e-mail daily and generally check their messages more than once per day. This increased usage of e-mail provides a reliable, efficient, and fast way of getting in touch with others.

Like voice mail, e-mail enables messages to be left for absent recipients. However, unlike most voice mail systems, the capacity of an e-mail account is virtually limitless. E-mail is cheap to use, faster than postal conveyance, and permits group communication. The only current drawback is that e-mail requires the sender to type.

Most of the participants reported that "junk" e-mail bothers them. This is consistent with the finding that many choose to not belong to discussion lists, which lead to dramatically increased e-mail volume. Most people prefer to read only the e-mail that they are expecting or e-mail coming from contacts whom they recognize. One-fifth actually read less than half of their e-mail, indicating that they assume the remaining unread messages tend to be unimportant "junk" e-mail. Less than 10% reply to all e-mail messages, attesting that they are either not concerned with the e-mails that are not important to them, or that much of their e-mail is more informational than conversational. Because of the instant sending and receiving capabilities of e-mail, the

expected reply time is very short for most students. This is congruous with the fact that most students use e-mail daily, but these expectations may create problems when students communicate with others who check e-mail more sporadically.

There are mixed feelings about the security of e-mail. Some believe that it is private and protected from others' viewing, while others feel that sending personal information is a problem. Revealing personal information, particularly names and e-mail addresses, opens up windows of opportunity for companies to purchase lists that can be used for solicitation purposes. Because e-mail has not been proven to be one hundred percent secure, companies often monitor outgoing as well as incoming e-mail to avoid security issues. A surprisingly low percentage of students said that these newer communication technologies are reliable, despite the fact that a large number depend upon this technology on a daily basis. This situation seems likely to contribute to higher levels of frustration and anxiety. Depending more and more upon unpredictable technology can increase feelings of helplessness.

As newer and more reliable technologies become available, the majority of students did not express feelings of frustration or negativity towards learning such technologies. This optimistic view of the modernization of our communication resources can facilitate development of more reliable and optimal communication systems. There was no evidence that college students are resistant to changing the communication system in order to exploit the latest technological features.

Future research on this topic has the potential to improve implementation of newer communication technologies. Such research can explore the relative proportion of junk mail received on a daily basis as compared to the amount of legitimate e-mail.

Another area of possible research would involve determining the relationship between students' grade point average and e-mail habits, assess how personality characteristics such as introversion/extroversion might mediate this association. This would also allow for a clearer assessment of whether extroverts or introverts, regardless of time spent on e-mail, have their work differentially compromised by procrastinating. The way in which these new technologies aggravate procrastination tendencies can also be determined.

Future research might also investigate the impact of real time chat capabilities, better know as instant messages. These message systems allow for people to communicate with others without the delays associated with checking and rechecking e-mail constantly. These messaging technologies have the potential to transform communication particularly because voice chat capabilities are now available. This voice chat enables people to talk in real time, without having to type. With this ever changing and evolving technology, the future holds the promise of steadily improved communication ability. These technologies will allow families, friends, businesses, and students to communicate in ways that presently are inconceivable. These possibilities might allow students from the United States to learn Spanish from actual Spaniards. The future holds few limits, and many current students seem eager to embrace new technology as it becomes available.

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